

1,005,849

# PATENT SPECIFICATION

1,005,849

DRAWINGS ATTACHED.



*Date of Application and filing Complete Specification:*  
Aug. 31, 1964.

No. 35612/64.

*Application made in United States of America (No. 343,321)*  
on Feb. 7, 1964.

*Complete Specification Published: Sept. 29, 1965.*

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Index at Acceptance:—A6 S(19D3B, 19D4, 19D6).

Int. Cl.:—A 63 17h /00.

## COMPLETE SPECIFICATION.

### Wheeled Vehicle Chassis for a Toy or the like.

#### ERRATA

#### SPECIFICATION NO. 1,005,849

Page 1, Int.Cl. for "A63 17h/CO" read "A63h 17/CO".

Page 1, line 64, for "one or more" read "two".

Page 1, lines 77 & 78, for "one or more" read "two".

Page 2, line 58, for "batties" read "batteries".

Page 3, line 31, for "journaled" read "journalled".

Page 3, line 47, for "simultanteously" read "simultaneously".

Page 5, line 77, for "at least one dry cell" read "two dry cell batteries".

Page 5, line 87, for "dry cell" read "batteries, in which the front wheel assembly includes two front mounting and contacting members secured to the chassis body, the said members acting to mount the front wheel assembly on the chassis body and having respective battery contacts positioned to engage the batteries".

Page 5, line 106, for "journaled" read "journalled".

Page 6, lines 1 to 9, delete "Lines one to nine".

Page 6, line 10, for "8" read "7".

Page 6, line 14, for "9" read "8".

Page 6, line 14, for "claims 7, 8 and 9" read "claim 7".

Page 6, line 22, for "10" read "9".

THE PATENT OFFICE,  
7th March, 1967

D 806

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### Wheeled Vehicle Chassis for a Toy or the like.

We, IDEAL TOY CORPORATION, of 184—10 Jamaica Avenue, Hollis, New York, United States of America; a corporation organised and existing under the laws of the State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates generally to toys, and in particular to a miniature driven wheeled chassis for use with one of a plurality of vehicle bodies.

Small scale or miniature replicas of a wide variety of objects has become a subject of interest to both adult and juvenile collectors. Miniature scale models of trains, airplanes, cars boats and the like are available to those who are interested. Particularly with respect to miniatures of various types of vehicles, it has been suggested that a single universal chassis could be employed for interchangeable assembly with one of a plurality of vehicle bodies which are shaped and ornamented to represent different types of well known cars and trucks. However, such known universal chassis and interchangeable bodies have not achieved any wide spread popularity or notoriety. There exists a need for a driven chassis or undercarriage for a vehicle which can serve as the foundation or building block for a wide variety of vehicle types, which by the simple expedient of removing one vehicle body and replacing the same with another can provide the user with a small scale replica of one of many diverse types of popular vehicles.

Broadly, it is an object of the present invention to provide a wheeled and driven vehicle chassis which realizes one or more of the aforesaid objectives. Specifically, it is within the contemplation of the present invention to provide a chassis for interchangeable assembly with diverse types of vehicle bodies which is motor driven from a self-contained battery source and may be adjusted to follow different courses. 45

In accordance with an illustrative embodiment demonstrating objects and features of the present invention, there is provided a driven wheeled chassis for interchangeable use with different vehicle bodies which comprises an elongated chassis body having front and rear ends. A front wheel assembly having steerable front wheels is mounted on the chassis body adjacent to the front end thereof. A rear wheel assembly having non-steerable rear wheels is mounted on the chassis body rearwardly of the front wheel assembly. Provision is made on the chassis body intermediate the front and rear wheel assemblies to define a battery cradle which is adapted to receive one or more batteries. Provision is made on the chassis body adjacent the rear end thereof to define a motor cradle which includes two rear mounting and contacting members. A battery-operated motor is received within the motor cradle and has respective input terminals and a motor shaft extending transversely of the chassis body. Provision is made on the rear mounting and contacting members for releasably securing the motor within the motor cradle, with such rear members being electrically conductive and having respective motor and battery contacts for electrically connecting the one or more batteries in an energization circuit with the input terminals of the motor. Finally, provision is made for operatively connecting the motor shaft to the rear wheel assembly for imparting drive thereto. The arrangement of the battery and motor cradles and the remaining components of 50 55 60 65 70 75 80

the chassis require to complete both the mechanical and electrical assemblies thereof is such as to facilitate the miniaturization of the chassis and the corresponding line of vehicle 5 b dies to be interchangeably engaged therewith. This effectively enhances the play value and interest of these items in enabling the provision of a relatively small scale line. Further, the construction is such as to permit 10 the ready removal of one or both batteries, the motor, or both for the purpose of replacement and/or to enhance the play value of the line of toys which may be created in accordance with the present invention.

15 The above brief description, as well as further objects, features and advantages of the present invention will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment demonstrating objects and features of the present invention, wherein:

FIG. 1 is an exploded side elevational view, with parts broken away showing a driven 25 wheeled chassis embodying features of the present invention and a typical vehicle body which may be interchangeably assembled therewith;

FIG. 2 is a plan view of the driven wheeled chassis, shown with the motor and batteries 30 assembled therewith;

FIG. 3 is a sectional view taken substantially along the line 3—3 of FIG. 1 and looking in the direction of the arrows, showing 35 details of the construction of the battery cradle;

FIG. 4 is a sectional view taken substantially along the line 4—4 of FIG. 2 and looking in the direction of the arrows, showing 40 details of the construction of the motor cradle;

FIG. 5 is a front elevational view of the chassis taken from the right of FIG. 2; and,

FIG. 6 is a schematic diagram showing the 45 energization circuit for the battery-operated motor incorporated in the instant chassis.

In the drawings, there is shown a vehicle chassis embodying features of the present invention, generally designated by the reference numeral 10, for interchangeable use with anyone of a number of different vehicle bodies, such as the illustrative body 12. The illustrative body 12 is but one of a series which may be detachably secured to the 50 chassis 10, with the design of the body only being limited in the requirement that it accommodate the chassis with the motor and batteries in their corresponding working positions. The scale in the illustrative drawings is 55 approximately twice that contemplated for vehicles embodying features of the present invention. In a typical construction, the overall length of the chassis will be of the order of inches. Notwithstanding such 60 miniaturization, the chassis 10 will have the 65

necessary functional attributes to enable the provision of a self-contained battery drive and the capability of steering the vehicle while the vehicle body 12 is capable of being 70 ornamented and dressed to provide a small-scale replica having a good likeness to its full scale counterpart.

Referring now specifically to FIGS. 1 and 2, the chassis 10 is seen to include an elongated chassis body 14 having front and rear ends. A front wheel assembly, generally designated by the reference numeral 16 and having left and right front steerable wheels 18, 20, is mounted on the chassis body 14 adjacent to the front end thereof. Disposed rearwardly of the front wheel assembly 16 is a rear wheel assembly, generally designated by the reference numeral 22, which includes non-steerable left and right rear wheels 24, 26. The reference throughout the specification to "left" and "right" components is intended to orient such components as viewed from the position of the drive when seated in the vehicle.

Intermediate the front and rear wheel assemblies 16, 22 and in a position corresponding to the main body of the vehicle there is provided a battery cradle, generally designated by the reference numeral 28, which in this illustrative assembly receives side by side batteries, 30, 32 which extend lengthwise of the chassis body 14 and are substantially hidden from view by the vehicle body 12 when assembled with the chassis 10.

Disposed rearwardly of the rear wheel assembly 22 in the trunk region of the vehicle, there is provided a motor cradle, generally designated by the reference numeral 34, which receives a battery-operated miniature motor 36. As will be subsequently described, the motor 36 is operatively connected to the right rear wheel 26 of the rear wheel assembly 22 for imparting drive thereto and is connected in an energization circuit 105 with the batteries 30, 32 which may be selectively completed and disrupted. As the description proceeds and from the foregoing explanation of the general arrangement, it will be appreciated that there is provided an 110 exceptionally compact arrangement lending itself admirably to miniaturization and the facility for removal and replacement of the batteries 30, 32 and the motor 36.

As seen best in FIGS. 1, 2 and 5, the front 115 wheel assembly 16 includes left and right front mounting and contacting members 38, 40 which are of identical construction, and are fabricated of an electrically conductive material, such as bronze stampings. The left 120 front mounting and contacting member 38 includes a planar base 38a which rests against and is secured to the underlying portion of the chassis body 14 and is secured thereto as by rivet 42. The member 38 further includes 125

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an upstanding resilient left front battery contact 38b which is positioned at the corresponding forward end of the battery cradle 28 in position to engage the center terminal 5 of the battery 30. Similarly, the right front mounting and contacting member 40 is secured to the chassis body 14 by rivet 44 and includes a planar base 40a and an upstanding resilient right front battery contact 40b located at the corresponding forward end of the battery cradle 28 in position to contact the casing of the battery 32. In order to laterally confine the contacts 38b, 40b and to assure that such contacts will only move lengthwise 10 of the chassis 10, the chassis body 14 is provided with upstanding contact-bracing ribs, such as the ribs 14a, 14b associated with the contact 38b which contribute to the structural stability of the construction and preclude the possibility of the respective members 38, 40 rotating about the rivets 42, 44. The left front wheel 18 of the front wheel assembly 16 is journaled on a left front axle 44 which extends horizontally and is suspended on a knuckle 46 journaled on a left front king pin 48. Thus, the wheel 18 is capable of rotating about its corresponding horizontal wheel axis which may be turned 25 about the vertical steering axis defined by the king pin 48. Similarly, the right front wheel 20 is journaled on a right front axle 50 which is secured to a right front knuckle 52 journaled on a right front king pin 54. Provision is made for coordinating the front wheels 18, 20 for adjustment about the steering axes defined by the king pins 48, 54 so that the vehicle [may] take different courses as set by the user. Specifically, the knuckles 46, 52 have respective knuckle arms 46a, 52a which 30 are interconnected by a tie rod 56 extending transversely of the chassis body 14 across the front end thereof. One end of the tie rod 56 is connected to the knuckle arm 46a by tie rod pin 58 and the other end of the tie rod 56 is connected to the knuckle arm 52 by tie rod pin 60. Thus, by grasping either of the front wheels 18, 20 and simultaneously adjusting the attitude of the wheels 18, 20 in relation 35 to the chassis body, it is possible to have the vehicle go forwardly, traverse a course to the left, or traverse a course to the right. The wheels 18, 20 of the front wheel assembly 16 and the wheels 24, 26 of the rear wheel assembly 22 are all substantially identical in 40 construction. Thus it will suffice to describe only one of the wheels in detail. For example, the wheel 18 includes a tire 18a, as of molded rubber, and appropriate ornamental wheel disc 18b which may be removably mounted 45 within the tire 18a, and a wheel hub 18c which may be removably engaged within the tire 18a and is arranged to accommodate the corresponding axle 44. The construction is such to enable the wheels to be dismantled 50 and reassembled by the user.

The rear wheel assembly 22 includes a rear axle 62 which extends transversely of the chassis body 14 intermediate the battery cradle 28 and the motor cradle 34. The axle 62 is retained on the chassis by integral bearings or journals, such as designated by the reference numerals 14c and 14d and as seen in FIGS. 2 and 4. The left and rear wheels 24, 26 are journaled on the rear axle 62, with at least the right rear wheel 26 being arranged to free-wheel. The battery cradle 28, details of which were seen best in FIGS. 1 to 3 inclusive, is defined by flanges molded integrally with the chassis body 14 including a left marginal flange 14e, Fig. 2, a right marginal flange 14f and plural pairs of opposed transverse flanges, such as flanges 14g, 14h, Fig. 3. The transverse flanges are appropriately cut away, as seen best in FIG. 3, to conform generally to the outline of the batteries, 30, 32 when placed within the cradle 28. With continued reference to FIG. 3, it will be seen that the chassis body 14 is provided with a central longitudinally extending reinforcing rib 14i which 55 medially partitions the battery cradle 28 into two side by side compartments adapted to receive the batteries 30, 32. The batteries 30, 32 are releasably secured in the battery cradle 28 by a battery hold-down clip 64 which may be fabricated of any appropriate materials such as molded plastic and is shaped generally to conform to the batteries when seated within the cradle 28. The clip 64 is formed with clip ears 64a, 64b at the opposite ends thereof which are received within appropriate cut-outs formed in the longitudinally extending marginal flanges 14e, 14f. The details of the motor cradle 34, 36 may be best appreciated by reference to FIGS. 1, 2 and 4. The motor cradle 34 includes a platform 14j formed integrally with the chassis body 14 and extending medially thereof which supports the motor 36 intermediate the ends thereof, as seen in FIG. 4. At the opposite sides of the platform 14j, the chassis body 14 is formed with longitudinally extending wells 14k, 14l which are of an extent to accommodate left and right rear mounting and contacting members 66, 68 which are fabricated of electrically conducted material, preferably bronze stampings. The members 66, 68 serve to releasably secure the motor 36 to the chassis, are part of the motor cradle 34, orient the motor 36 relative to the rear 60 wheel assembly 22 to establish drive thereto, and establish electrical connections between the batteries 30, 32 and the motor 36, as will be described hereinafter. The motor 36 is of the fractional horse-power battery-operated type and is of generally known construction. Such motors are commercially available from a number of sources and include a conductive casing 36a Fig. 4 serving as one input terminal thereof, 65

an insulated end wall 36b, Fig. 4 an input terminal 36c extending from the insulating wall 36b and coacting with the conductive casing 36a to complete the energization circuit for the motor, a motor shaft 36d projecting from the casing 36a at the side remote from the insulating wall 36b, and a shaft gear 36e secured to the motor shaft 36d. The motor 36 is received within the trunk 10 counterpart of the full scale vehicle and may be readily removed for replacement, repair or during play. Since the internal construction of the motor is generally well known and is subject to a latitude of modification, change 15 and substitution, further description of the motor will be dispensed with in the interest of brevity.

Reverting back to the left and right rear mounting and contacting members, the left 20 rear contacting member 66 is seen to include a base 66a Fig. 4 secured within the well 14k of the chassis body 14 by rivets 70 (see FIG. 4) and formed at its forward end with an integral upstanding resilient battery contact 25 66b Fig. 2. The battery contact 66b is disposed in spaced end to end relation with the battery contact 38b and is adapted to engage the casing or opposite pole of the battery 30. Similarly, the right rear mounting and contacting member 68 includes a base 68a Fig. 4 lying within the well 14l and secured therein as by one or more rivets 72 and terminates at its forward end in an upstanding integral, 30 resilient battery contact 68b. The battery contact 68b is disposed in spaced end to end relation with the battery contact 40b and engages the central terminal or pole of the battery 32. The member 66 is further formed with an upstanding resilient terminal contact 35 66c Figs. 2 and 4 which is adapted to engage the input terminal 36c projecting from the insulating wall 36b of the motor 36. Similarly, the member 68 is formed with a combined hold down clip and contact 68c which 40 is releasably engaged over the casing 36a to hold the motor in place and to complete an electrical contact to the casing 36a serving as the other input terminal to the motor 36. Additionally provision is made for orienting 45 the motor 36 in the motor cradle 34 to assure proper meshing of the motor gear 36e with the gear train connected to the rear wheel 26 and to hold the motor within the cradle against the vibrational and displacing forces 50 developed incident to normal usage. To this end, the member 66 is formed with a positioning clip 66d terminating in a detent accommodated in the cut-out formed in the adjacent end of the motor 36. The hold down 55 clip and contact 66c is formed with a detent 66d intermediate the ends thereof which is likewise received within a cut-out formed in the motor. If necessary, the holding forces may be further supplemented by the provision 60 of an auxiliary retaining clip 68e (see

FIGS. 1 and 2) which includes a detent received within the cut-out in the adjacent corner of the motor 36.

The driving train from the motor 36 to the right rear wheel 26 is completed by the provision of an idler assembly 74 which is journaled on the member 68 and includes a large diameter gear 74a which is in meshing engagement with the shaft gear 36e and a small diameter gear 70d which is in meshing engagement with a wheel gear 76 secured to the rear wheel 26 inwardly thereof. The gears 36e and 74b are of relatively wide width as compared to their meshing counterparts such that a driving train will be completed notwithstanding a certain degree of side to side displacement of the motor 36 relative to the rear wheel assembly 22 as may be encountered incident to normal manufacturing tolerances.

A manually controlled switch is provided for selectively completing and interrupting the energization circuit for the battery-operated motor 36. In this illustrative embodiment, the front wheel assembly 16 includes a conductive switch blade 76 which overlies the conductive bases 38a, 40a of the front mounting and contacting members 38, 40. The switch blade 76 is secured to an appropriate blade actuator 78 Figs. 1, 3 and 5 which is journaled on the chassis body 14 and terminates in a head at the underside of the chassis body at a location readily accessible for manipulation. An appropriate detent locking arrangement, such as shown in FIG. 5, may be associated with the blade 76 and the blade actuator 78 to hold the same in its position straddling the bases 38a, 40a to complete the electrical circuit or out of contact with one of the other bases to disrupt the energization circuit. In this embodiment, the underside of the tie-rod 56 is formed with plural teeth 56a which are engaged by a positioning finger 78a formed integrally with the blade actuator 78. As seen in FIG. 6, the energization circuit for the motor 36 includes the batteries 30, 32 connected in series with the input terminals of the motor 36, with the circuit being selectively completed and interrupted by the switch blade 76 which may be brought into straddling relation with respect to the contacts 38a, 40a upon manual manipulation of the actuator 78.

Various expedients may be employed for releasably securing the vehicle body 12 to the chassis 10 to customize the chassis in accordance with the particular design of the vehicle body 12. In this illustrative embodiment, the chassis 10 is provided with an integral front body-engaging lug 80 adapted to be received in a corresponding recess contiguous to the front bumper of the vehicle 12, a rear body-engaging lug 82 adapted to be received in a corresponding recess formed in the vehicle body contiguous to the rear bumper thereof, and respective left and right body-engaging

5 lugs 84, 86 width are adapted to be received in corresponding recesses or cut-outs formed in the opposite sides of the vehicle body, as seen in FIG. 3. The vehicle body 12 itself is fabricated of an appropriate plastic, and accordingly may be flexed to afford a snap interfit with the corresponding lugs 80, 82, 84, 86 on the chassis 10. As previously indicated, the vehicle body is subject to a latitude of 10 modification and change in its construction and may be fabricated to accurately simulate a full size vehicle, with the main body portion being of plastic and having detailing corresponding to the intended vehicle, with windows fabricated of transparent plastic, and with various fittings (i.e. bumpers, ornamental door handles and the like) being of appropriate chrome-plated metal and being permanently or detachably secured to the 15 vehicle body.

10 In actual use, it is but a simple matter to place the batteries 30, 32 into the battery cradle 28 and engage the clip 64 thereover to secure the batteries in engagement with the 20 respective battery contacts 38b, 40b, 66b and 68b. This is preferably done with the switch 76 in the open position. Thereupon, the motor 36 is engaged within the motor cradle 34, care being taken to assure that the 25 motor is properly positioned relative to the cradle and with the provision of electrical connections between the casing 36a and the contact 60c and the insulated input terminal 36c and its corresponding contact 36c. It 30 should be noted as may be appreciated by inspecting FIG. 4 that the combined mounting and contacting member 66 is completely insulated from the casing 36a of the motor 36. The vehicle chassis is then customized in 35 accordance with the user's wishes by selecting the appropriate vehicle body and releasably engaging the same with the chassis. The thus customized vehicle is ready for use and may be placed into operation by manipulation of the switch actuator 78 from the underside of the chassis, with the user establishing the desired course for the vehicle by grasping one or the other of the front wheels 18, 20 and adjusting the front wheel assembly 16.

40 From the foregoing, it will be appreciated that there has been provided in accordance with the present invention an exceptionally compact and rugged chassis for universal engagement with different vehicle bodies. Relatively few number of parts are employed in 45 constructing the chassis including a body of an appropriate molded plastic, such as a styrene, and stamped metallic parts, such as the members 38, 40, 66, 68 secured to the body by the simple expedient of riveting. In 50 many instances a single stamping or piece serves a number of functions in the mechanical construction and the electrical circuitry. Thus, the chassis may be made on a mass 55 production basis at relatively low unit cost.

## WHAT WE CLAIM IS:—

1. A toy comprising a driven wheeled chassis adapted for interchangeable assembly with one of a plurality of vehicle bodies comprising an elongated chassis body, a front wheel assembly mounted adjacent the front end of said chassis body, a rear wheel assembly mounted rearwardly of said front wheel assembly on said chassis body, means on said chassis body intermediate said front and rear wheel assemblies defining a battery cradle for at least one dry cell, means on said chassis body rearwardly of said rear wheel assembly defining a motor cradle, a battery-operated motor removably mounted in said motor cradle and including a motor shaft, means operatively connecting said motor shaft to said rear wheel assembly, and means for completing an energization circuit for said motor including plural battery contacts positioned in relation to said battery cradle to engage said dry cell. 70
2. A toy according to claim 1, characterized by said battery cradle including a removable hold-down clip on said chassis body. 80
3. A toy according to claim 1 or 2 characterized by said front wheel assembly includes left and right front wheels, left and right axles journaling said front wheels for rotation about respective wheel axes, left and right suspending means including king pins mounting said front wheels for movement about respective steering axes, and tie means interconnected between said left and right suspending means for according movement of said front wheels about said steering axes. 90
4. A toy according to claim 3, characterized by said rear wheel assembly including a rear axle mounted on said chassis body, left and right rear wheels journaled on said rear axle for rotation about a common wheel axis, and a rear wheel gear operatively connected to one of said rear wheels and to said motor shaft. 95
5. A toy according to claim 4, characterized by a shaft gear secured to said motor shaft and idler gearing intergaged between said rear wheel gear. 110
6. A toy according to any of the preceding claims characterized by said motor cradle including two rear mounting and contacting members, said motor shaft extending transversely of said chassis body and having respective input terminals, said rear members having respective mounting clips releasably engaging said motor and securing said motor within said motor cradle, said rear members being electrically conductive and having respective motor and battery contacts for electrically connecting said batteries in an energization circuit with said input terminals of said motor, and means operatively connecting said motor shaft to said rear wheel assembly for imparting drive thereto. 115
7. A toy according to claim 6, characterized by a front wheel assembly including a front axle mounted on said chassis body, left and right front wheels journaled on said front axle for rotation about a common wheel axis, and a front wheel gear operatively connected to one of said front wheels and to said motor shaft. 120
8. A toy according to claim 7, characterized by a front wheel assembly including a front axle mounted on said chassis body, left and right front wheels journaled on said front axle for rotation about a common wheel axis, and a front wheel gear operatively connected to one of said front wheels and to said motor shaft. 125
9. A toy according to claim 8, characterized by a front wheel assembly including a front axle mounted on said chassis body, left and right front wheels journaled on said front axle for rotation about a common wheel axis, and a front wheel gear operatively connected to one of said front wheels and to said motor shaft. 130

7. A toy according to any of the preceding claims characterized in that said front wheel assembly includes two front mounting and contacting members, said front members being secured to said chassis body, said front members being electrically conductive and having respective battery contacts for electrically connecting said batteries in said energization circuit.

9. A toy according to claims 7, 8 and 9 characterized by said switch including a switch blade movable into and out of an operative position electrically connecting said front mounting and contacting members, and a switch actuator extending to the underside of said chassis body and operatively connected to said switch blade.

10. A toy according to any of the preceding claims characterized by a switch for selectively completing and interrupting said energization circuit.

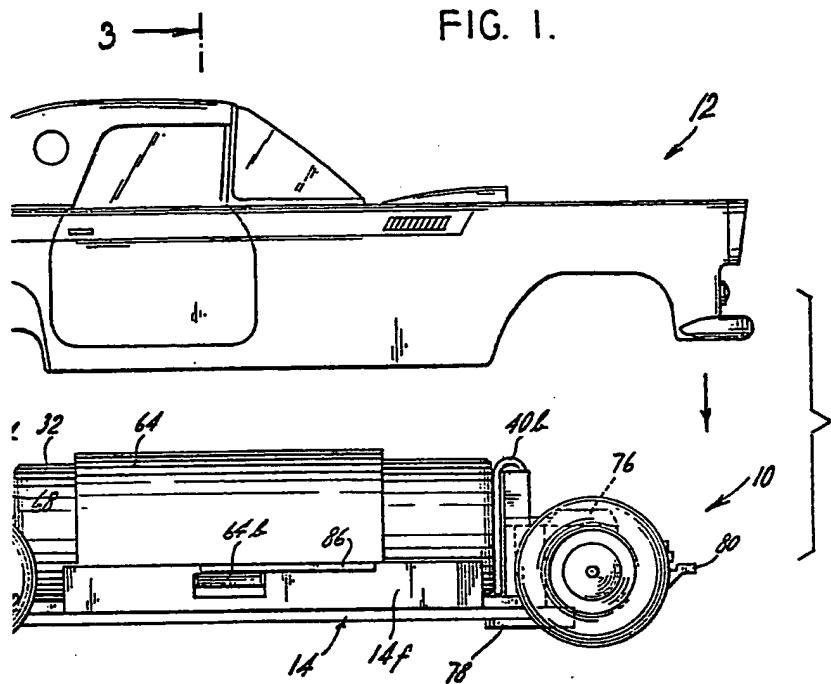
10. A toy substantially as described and shown in the accompanying drawings.

POTTS & CO.

Abingdon: Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1965.  
Published at The Patent Office, 25 Southampton Buildings, London, W.C.2,  
from which copies may be obtained.

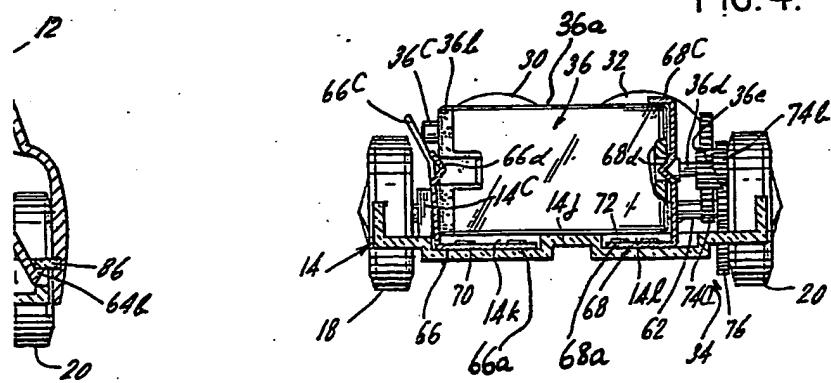
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2 SHEETS    This drawing is a reproduction of  
                  the Original on a reduced scale  
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FIG. 1.



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FIG. 4.



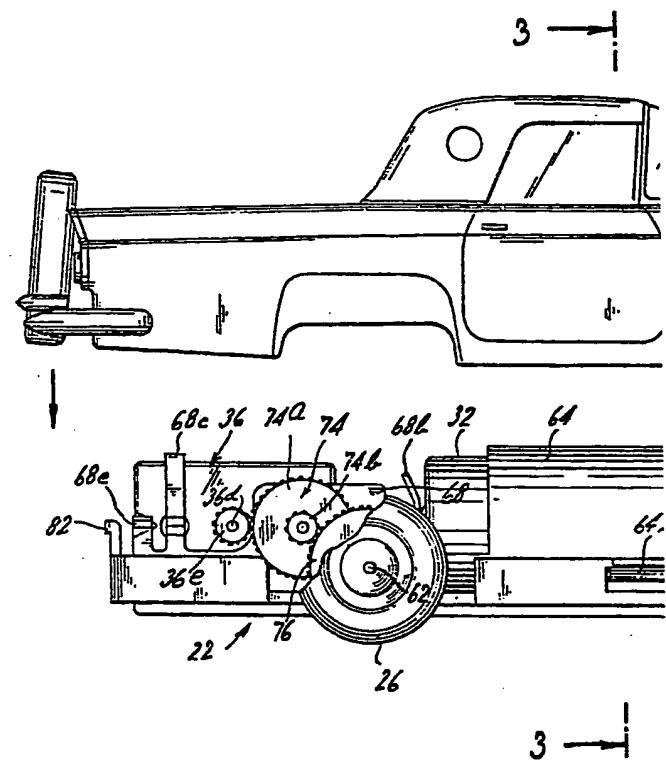


FIG. 3.

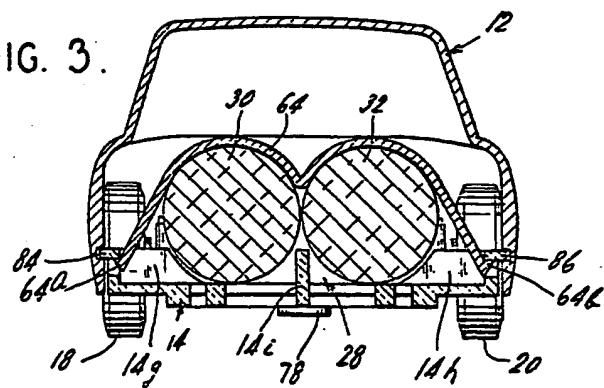


FIG. 1.

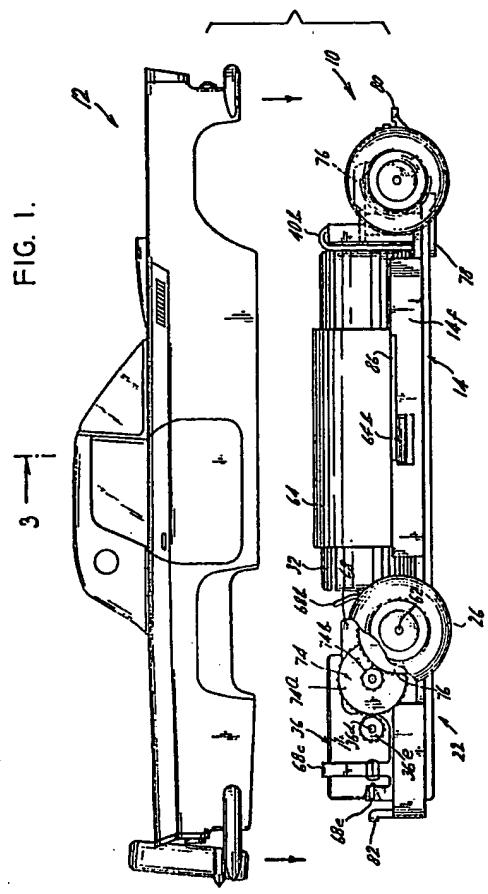
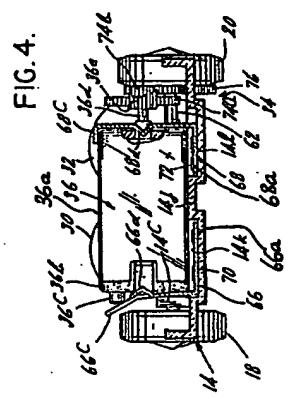


FIG. 4.



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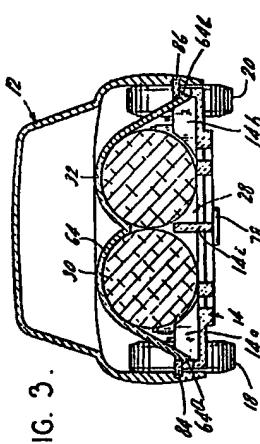
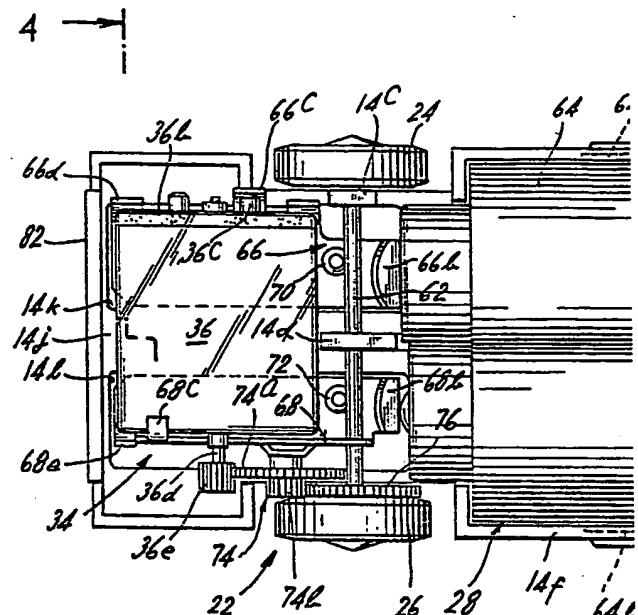


FIG. 2



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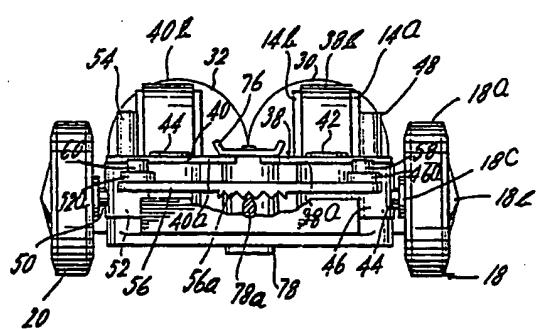


FIG. 5.

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 Sheet 2

FIG. 2.

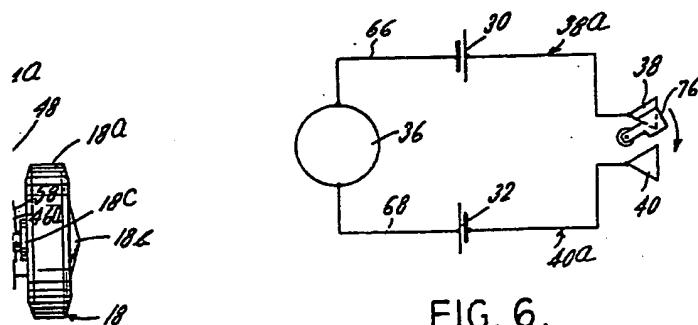
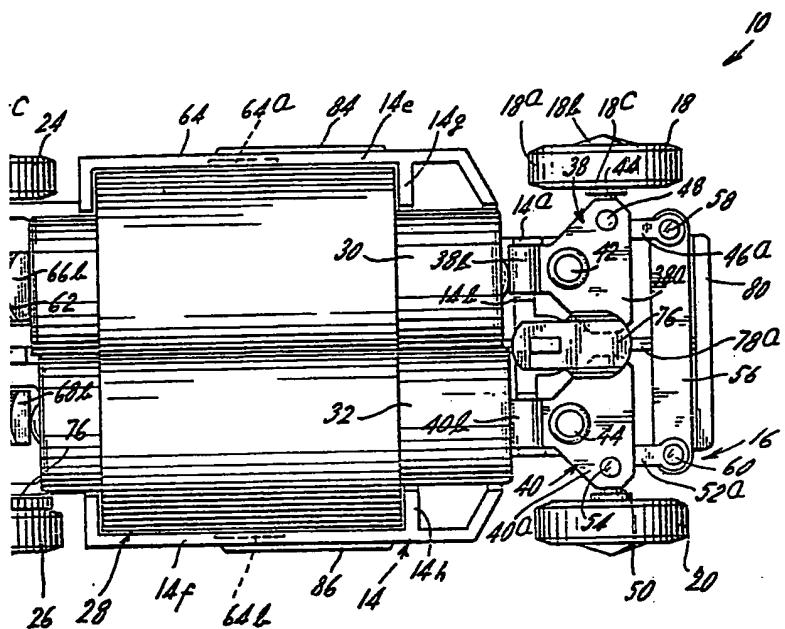
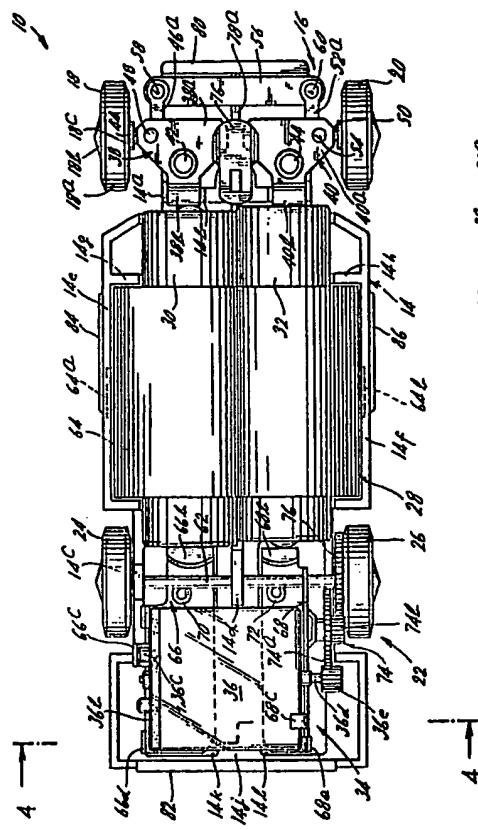


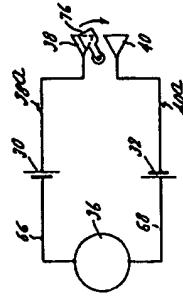
FIG. 6.

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FIG. 2.



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